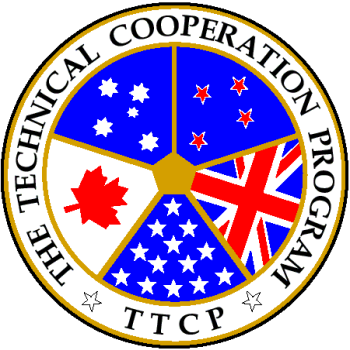
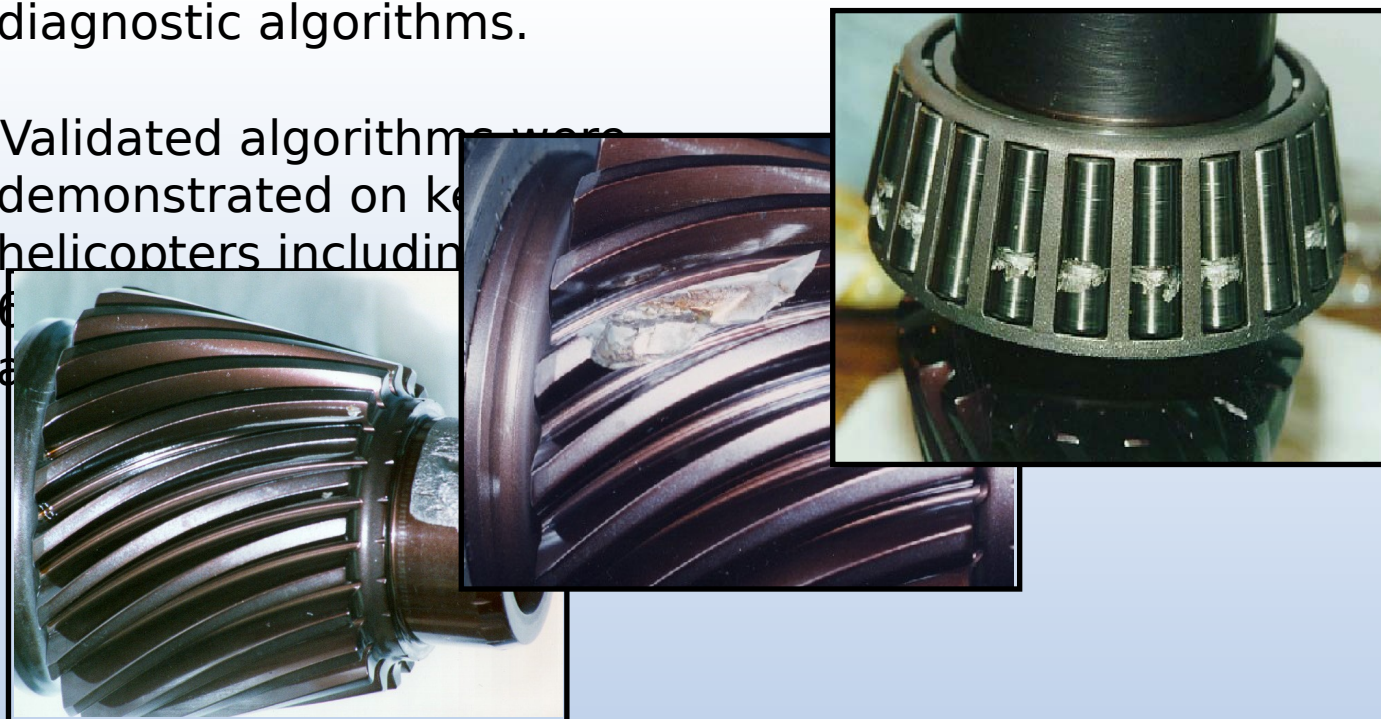
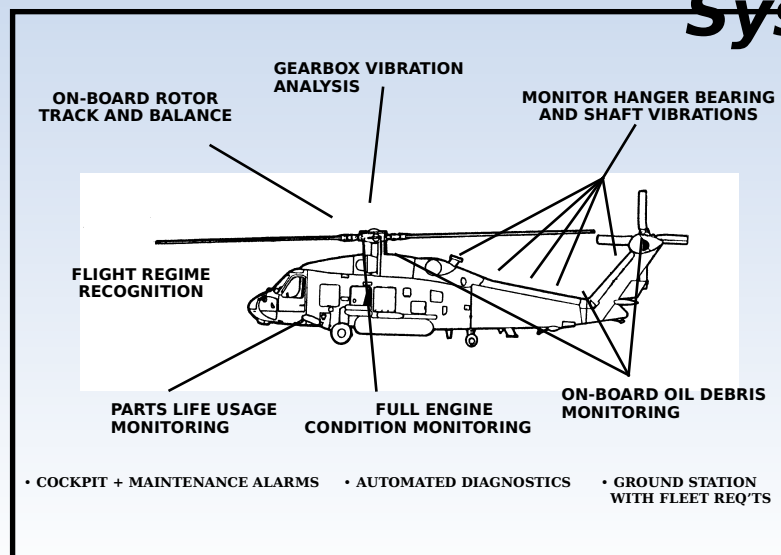




Helicopter Integrated Diagnostic System

TTCP Aerospace Systems Group / Propulsion and Power

- Mechanical defects can be detected using algorithms that watch for specific characteristics within the dynamic vibration environment.
- Seeded fault samples were used to characterize particular defects and refine the diagnostic algorithms.
- Validated algorithms were demonstrated on key helicopters including



Objective: To develop advanced algorithms to isolate safety critical fault vibration signatures from complex machinery environments

Payoff: Over 50% of all helicopter safety critical defects are related to engine, gearbox and mechanical drive-train failures. Advanced vibration monitoring systems will enable such defects to be diagnosed and isolated before critical failure, thus improving airworthiness. The introduction of such systems will also greatly reduce the need for routine preventative inspections, thus improving fleet availability.

Demonstrated on US Navy SH-60 and Australian S-70, the technology is now in-service on CH-53 Sea Stallion, SH-60 Sea Hawk and AH-1Z Cobra as part of the Integrated Mechanical Diagnostics (IMD) system. Australia is also exploiting components of resultant technology on its Sea King and Sea Hawks.



Future Activities: Follow-on studies have been extending the approach to predict fault occurrence (prognostics) rather than diagnose a developing failure. The group is also studying power margin assurance systems to ensure sufficient lift is available when needed and hence improve safety.